

What is claimed is:

1. A fabric article treating system, comprising:

a fabric article drying appliance having a chamber and a closure structure, said closure structure having a closed position and at least one open position, said closure structure allowing
5 access to said chamber; a source of benefit composition; a nozzle in communication with said chamber; a dispensing apparatus that compels benefit composition from said source of benefit composition toward said nozzle, thereby spraying said benefit composition into said chamber; a closure structure sensor; and

a control circuit that initiates spraying of said benefit composition, wherein said control
10 circuit prevents said benefit composition from being sprayed when said closure structure sensor indicates that said closure structure is not in said closed position.

2. The treating system as recited in claim 1, wherein said closure structure sensor comprises:
(a) a light-sensitive device; (b) a pressure-sensitive conductor; or a combination thereof.

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3. The treating system as recited in claim 1, further comprising: a motion sensor;
wherein said chamber may be placed into motion during operation; and
wherein said control circuit prevents said benefit composition from being sprayed when said
motion sensor indicates that said movable chamber is not in motion.

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4. The treating system as recited in claim 1, further comprising: a motion sensor;
wherein said chamber may have induced air movement therewithin during operation; and
wherein said control circuit prevents said benefit composition from being sprayed when said
motion sensor indicates that there is not sufficient air movement presently occurring within said
25 chamber.

5. The treating system as recited in claim 1, further comprising: a charging circuit that
imparts an electrical charge to said benefit composition, thereby generating an electrostatic spray.

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6. The treating system as recited in claim 5, wherein said charging circuit comprises a high
voltage power supply having a variable output voltage that is controlled by said control circuit, and
wherein said control circuit is further configured to vary said output voltage of the high voltage power
supply that is imparted to said benefit composition such that a first output voltage is generated during

a first spraying interval of a spraying event, and a second, different output voltage is generated during a second spraying interval of said spraying event.

5 7. The treating system as recited in claim 6, wherein said first spraying interval and said second spraying interval are separated in time, thereby causing said treating system to exhibit said first spraying interval, then to preclude spraying, and then to exhibit said second spraying interval.

10 8. The treating system as recited in claim 7, further comprising a humidity sensor mounted in communication with said chamber, wherein said second spraying interval commences when said humidity sensor determines that a critical moisture content has been achieved in said fabric article drying appliance

9. The treating system as recited in claim 7, further comprising: a humidity sensor mounted in communication with said chamber, wherein said control circuit is further configured to:

15 (a) commence said first spraying interval when said humidity sensor determines that a relative humidity in said fabric article drying appliance is greater than 40%;

(b) commence said second spraying interval when said humidity sensor determines that a relative humidity in said fabric article drying appliance is less than 40%;

(c) or a combination thereof.

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10. The treating system as recited in claim 7, further comprising a temperature sensor mounted in communication with said chamber, wherein said second spraying interval commences when said temperature sensor determines that a cool-down cycle of said fabric article drying appliance is in progress.

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11. The treating system as recited in claim 1, further comprising a temperature sensor mounted in communication with said chamber, wherein said control circuit prevents said benefit composition from being sprayed when said temperature sensor indicates that said fabric article drying appliance is not properly operating.

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12. The treating system as recited in claim 5, wherein:

(a) said control circuit comprises at least one of: (i) a sequential processing apparatus, (ii) a parallel processing apparatus, (iii) a logic state machine apparatus, and (iv) discrete analog and logic electronic circuitry;

(b) said source of benefit composition comprises a reservoir;

5 (c) said charging circuit comprises a high voltage power supply;

(d) said dispensing apparatus that compels said benefit composition comprises a pump apparatus;

and further comprising:

10 an electrical conductor that carries an output voltage from said high voltage power supply to an electrode, which thereby charges said benefit composition; and an electrical power source.

13. The treating system as recited in claim 12, further comprising: (a) a first enclosure, (b) a second enclosure, (c) an electrical cable in communication with said first and second enclosures; and (d) an electric motor that actuates said pump apparatus; and wherein:

15 (e) said first enclosure is located in an exterior relationship to said fabric article drying appliance, and said first enclosure comprises: (i) said electrical power source; and (ii) said control circuit;

(f) said second enclosure is located in an interior relationship to said fabric article drying appliance, and said second enclosure comprises: (i) said reservoir, initially containing said benefit composition; (ii) said high voltage power supply; (iii) said pump apparatus; (iv) said electric motor; 20 (v) said electrode, and said electrical conductor carrying the output voltage to the electrode; (vi) said nozzle; and (viii) said closure structure sensor; and

(g) said electric cable carries: (i) electrical energy from said electrical power source to said high voltage power supply, (ii) at least one signal from said control circuit to said electric motor; and 25 (iii) at least one signal from said closure structure sensor to said control circuit.

14. The treating system as recited in claim 12, further comprising: a voltage sensing circuit; and an electric motor that actuates said pump apparatus; and wherein:

(a) said electrical power source comprises a battery;

30 (b) said voltage sensing circuit determines an output voltage produced by said battery;

(c) said control circuit generates a pulse-width modulated variable output signal that controls said electric motor; and

(d) said control circuit is further configured to increase a duty cycle of said pulse-width modulated variable output signal as said battery-produced output voltage decreases, thereby causing said pump apparatus to provide a substantially constant volume of said benefit composition to said nozzle even though said battery has become partially discharged such that it cannot maintain its rated output voltage.

15. The treating system as recited in claim 12, further comprising: a voltage sensing circuit; and wherein:

(a) said electrical power source comprises a battery;

(b) said voltage sensing circuit determines an output voltage produced by said battery; and

(c) said control circuit is further configured to maintain said variable output voltage of the high voltage power supply at a substantially constant magnitude as said battery-produced output voltage decreases when said battery has become partially discharged such that it cannot maintain its rated output voltage.

16. The treating system as recited in claim 12, further comprising: (a) an enclosure that is mounted at an interior location of said fabric article drying appliance, and (b) an electric motor that actuates said pump apparatus; and wherein:

said enclosure contains (i) said electrical power source; (ii) said control circuit; (iii) said reservoir, initially containing said benefit composition; (iv) said high voltage power supply; (v) said pump apparatus; (vi) said electric motor; (vii) said electrode, and said electrical conductor carrying the output voltage to the electrode; (viii) said nozzle; and (ix) said closure structure sensor.

17. The treating system as recited in claim 1, wherein a spraying event comprises a first spraying interval and a second spraying interval, wherein said first spraying interval and said second spraying interval are separated in time, thereby causing said treating system to exhibit said first spraying interval, then to preclude spraying, and then to exhibit said second spraying interval.

18. The treating system as recited in claim 17, further comprising a humidity sensor mounted in communication with said chamber, wherein said second spraying interval commences when said humidity sensor determines that a critical moisture content has been achieved in said fabric article drying appliance.

19. The treating system as recited in claim 17, further comprising a temperature sensor mounted in communication with said chamber, wherein said second spraying interval commences when said temperature sensor determines that a cool-down cycle of said fabric article drying appliance is in progress.

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20. A fabric article treating system comprising:

a fabric article drying appliance having a movable chamber and a closure structure, said closure structure having a closed position and at least one open position, said closure structure allowing access to said movable chamber, said movable chamber being placed into motion during operation; a source of benefit composition; a nozzle in communication with said movable chamber; a dispensing apparatus that compels benefit composition from said source of benefit composition to said nozzle, thereby spraying said benefit composition into said movable chamber; a motion sensor; and

a control circuit that initiates spraying of said benefit composition, wherein said control circuit prevents said benefit composition from being sprayed when said motion sensor indicates that said movable chamber is not in motion.

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21. The treating system as recited in claim 20, wherein said motion sensor comprises a vibration-sensitive device.

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22. The treating system as recited in claim 20, wherein said motion sensor comprises a sound-sensitive device.

23. A fabric article treating system comprising:

fabric article drying appliance having a chamber and a closure structure, said closure structure having a closed position and at least one open position, said closure structure allowing access to said chamber; a source of benefit composition; a nozzle in communication with said chamber; a dispensing apparatus that compels benefit composition from said source of benefit composition toward said nozzle, thereby spraying said benefit composition into said chamber; and

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a control circuit that is configured:

(a) to spray said benefit composition through said nozzle upon commencement of a spraying event; and

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(b) to initiate a first spraying interval of said spraying event and a second spraying interval of said spraying event, such that said first spraying interval and said second spraying interval are separated in time.

5 24. The treating system as recited in claim 23, wherein:

(a) said control circuit comprises at least one of: (i) a sequential processing apparatus, (ii) a parallel processing apparatus, (iii) a logic state machine apparatus, and (iv) discrete analog and logic electronic circuitry;

(b) said source of benefit composition comprises a reservoir;

10 (c) said dispensing apparatus that compels said benefit composition comprises a pump apparatus;

and further comprising: an electrical power source.

15 25. The treating system as recited in claim 24, wherein: said pump apparatus comprises one of: (a) an ultrasonic piezo pump, and (b) a peristaltic pump.

26. The treating system as recited in claim 24, wherein: said pump apparatus comprises a piezo pump having no moving parts except for controlled vibration.

20 27. The treating system as recited in claim 24, further comprising: an electric motor that actuates said pump apparatus.

28. A fabric article treating system used in a fabric article drying appliance, said treating system comprising:

25 a fabric article drying appliance having a chamber and a closure structure, said closure structure having a closed position and at least one open position, said closure structure allowing access to said chamber; a benefit composition reservoir; a nozzle in communication with said chamber; a pump apparatus that compels benefit composition from said benefit composition reservoir toward said nozzle, thereby spraying said benefit composition into said chamber; an electric motor
30 that actuates said pump apparatus; a battery; a voltage sensing circuit that determines an output voltage produced by said battery; and

a control circuit that is configured:

(a) to spray said benefit composition through said nozzle upon commencement of a spraying event;

(b) to generate a pulse-width modulated variable output signal that controls said electric motor; and

5 (c) to increase a duty cycle of said pulse-width modulated variable output signal as said battery-produced output voltage decreases, thereby causing said pump apparatus to provide a substantially constant volume of said benefit composition to said nozzle even though said battery has become partially discharged such that it cannot maintain its rated output voltage.

10 29. The treating system as recited in claim 28, wherein

(a) said control circuit comprises one of: (i) a sequential processing apparatus, (ii) a parallel processing apparatus, (iii) a logic state machine apparatus, and (iv) discrete analog and logic electronic circuitry.

15 30. A fabric article treating apparatus, said treating apparatus comprising :

a source of benefit composition; a nozzle in communication with said source of benefit composition; a dispensing apparatus that compels said benefit composition from said source of benefit composition toward said nozzle, thereby spraying said benefit composition; at least one safety sensor; and

20 a control circuit that initiates spraying of said benefit composition, wherein said control circuit prevents said benefit composition from being sprayed when said at least one safety sensor indicates that a predetermined condition exists.

25 31. The fabric article treating apparatus as recited in claim 30, wherein said at least one safety sensor comprises at least one of: (a) a light-sensitive sensor, (b) a motion sensor, (c) a temperature sensor, (d) a humidity sensor, and (e) a pressure sensor.

30 32. The fabric article treating apparatus as recited in claim 30, wherein said control circuit is configured to spray said benefit composition through said nozzle upon commencement of a spraying event, wherein said spraying event comprises a first spraying interval and a second spraying interval, and wherein said first spraying interval and said second spraying interval are separated in time, thereby causing said treating apparatus to exhibit said first spraying interval, then to preclude spraying, and then to exhibit said second spraying interval.

33. The fabric article treating apparatus as recited in claim 30, further comprising: a charging circuit that imparts an electrical charge to said benefit composition, thereby generating an electrostatic spray.

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34. The fabric article treating apparatus as recited in claim 33, wherein said charging circuit comprises a high voltage power supply having a variable output voltage that is controlled by said control circuit, and wherein said control circuit is further configured to vary said output voltage of the high voltage power supply that is imparted to said benefit composition such that a first output voltage is generated during a first spraying interval of a spraying event, and a second, different output voltage is generated during a second spraying interval of said spraying event.

35. The fabric article treating apparatus as recited in claim 34, wherein said first spraying interval and said second spraying interval are separated in time, thereby causing treating apparatus to exhibit said first spraying interval, then to preclude spraying, and then to exhibit said second spraying interval.

36. The fabric article treating apparatus as recited in claim 33, wherein:

(a) said control circuit comprises at least one of: (i) a sequential processing apparatus, (ii) a parallel processing apparatus, (iii) a logic state machine apparatus, and (iv) discrete analog and logic electronic circuitry;

(b) said source of benefit composition comprises a reservoir;

(c) said charging circuit comprises a high voltage power supply;

(d) said dispensing apparatus that compels said benefit composition comprises a pump apparatus;

and further comprising:

an electrical conductor that carries an output voltage from said high voltage power supply to an electrode, which thereby charges said benefit composition; and an electrical power source.

37. The fabric article treating apparatus as recited in claim 30, further comprising:

a fabric article drying appliance having a chamber and a closure structure, said closure structure having a closed position and at least one open position, said closure structure allowing access to said chamber; and wherein:

said nozzle is in communication with said chamber, and when appropriate, sprays said benefit composition into said chamber.

38. The fabric article treating apparatus as recited in claim 37, further comprising a single enclosure; wherein said source of benefit composition, said nozzle, said dispensing apparatus that compels said benefit composition from said source of benefit composition toward said nozzle, said at least one safety sensor, and said control circuit are all housed within said fabric article drying appliance.

39. The fabric article treating apparatus as recited in claim 37, wherein said source of benefit composition, said nozzle, said dispensing apparatus that compels said benefit composition from said source of benefit composition toward said nozzle, said at least one safety sensor, and said control circuit are integrated into a controller which is part of said fabric article drying appliance.

40. The fabric article treating apparatus as recited in claim 37, further comprising an interior enclosure and an exterior enclosure, wherein:

(a) said exterior enclosure is located in an exterior relationship to said fabric article drying appliance, said exterior enclosure comprising said control circuit and a source of electrical power; and

(b) said interior enclosure is located in an interior relationship to said fabric article drying appliance, said interior enclosure comprising said nozzle.

41. The fabric article treating apparatus as recited in claim 40, wherein:

said interior enclosure further comprises said source of benefit composition, said dispensing apparatus that compels said benefit composition from said source of benefit composition toward said nozzle, and said at least one safety sensor.

42. The fabric article treating apparatus as recited in claim 37, wherein said at least one safety sensor comprises a closure structure sensor, said closure structure having a closed position and at least one open position, said closure structure allowing access to said chamber; and wherein said predetermined condition occurs when said closure structure sensor indicates that said closure structure is not in said closed position.

43. The fabric article treating apparatus as recited in claim 42, wherein said closure structure sensor comprises one of: (a) a light-sensitive device; and (b) a pressure-sensitive conductor.

5 44. The fabric article treating apparatus as recited in claim 37, wherein said at least one safety sensor comprises a motion sensor, and said predetermined condition occurs when said motion sensor indicates that said chamber is not in motion.

10 45. The fabric article treating apparatus as recited in claim 30, wherein said at least one safety sensor comprises a pressure sensor positioned in a pathway between said source of benefit composition and said nozzle, and said predetermined condition occurs when said pressure sensor indicates a deleterious pressure condition.

15 46. The fabric article treating apparatus as recited in claim 37, wherein said at least one safety sensor comprises a temperature sensor mounted in communication with an interior region of said fabric article drying appliance, and said control circuit prevents said benefit composition from being sprayed when said temperature sensor indicates that said fabric article drying appliance is not properly operating.

20 47. The fabric article treating apparatus as recited in claim 37, wherein said control circuit is configured to spray said benefit composition through said nozzle upon commencement of a spraying event, wherein said spraying event comprises a first spraying interval and a second spraying interval, and further comprising:

25 a humidity sensor mounted in communication with said chamber, wherein said second spraying interval commences when said humidity sensor determines that a critical moisture content has been achieved in said chamber.

30 48. The fabric article treating apparatus as recited in claim 37, wherein said control circuit is configured to spray said benefit composition through said nozzle upon commencement of a spraying event, wherein said spraying event comprises at least a first spraying interval and a second spraying interval, and further comprising:

a temperature sensor mounted in communication with said chamber, wherein said second spraying interval commences when said temperature sensor determines that a cool-down cycle of said fabric article drying appliance is in progress.

49. The fabric article treating apparatus as recited in claim 30, further comprising: a battery; and a voltage sensing circuit that determines an output voltage produced by said battery; and wherein:

5 (a) said dispensing apparatus that compels said benefit composition comprises a pump apparatus driven by an electric motor; and

(b) said control circuit is configured: (i) to spray said benefit composition through said nozzle upon commencement of a spraying event; (ii) to generate a pulse-width modulated variable output signal that controls said electric motor; and (iii) to increase a duty cycle of said pulse-width modulated variable output signal as said battery-produced output voltage decreases, thereby causing
10 said pump apparatus to provide a substantially constant volume of said benefit composition to said nozzle even though said battery has become partially discharged such that it cannot maintain its rated output voltage.

50. The fabric article treating apparatus as recited in claim 30, further comprising: a battery;
15 a voltage sensing circuit that determines an output voltage produced by said battery; and a high voltage power supply having a variable output voltage that is controlled by said control circuit; and wherein said control circuit is further configured to maintain said variable output voltage of the high voltage power supply at a substantially constant magnitude as said battery-produced output voltage decreases when said battery has become partially discharged such that it cannot maintain its rated
20 output voltage.